

PATENT COOPERATION TREATY

RECEIVED

JUN 24 2008

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

Jackson & Co., LLP

To:

JACKSON & CO., LLP
 Attn. Smith, Andrew V.
 6114 La Salle Avenue 507
 Oakland CA 94611-2802
 ETATS-UNIS D'AMERIQUE

NOTIFICATION OF TRANSMITTAL OF
 THE INTERNATIONAL SEARCH REPORT AND
 THE WRITTEN OPINION OF THE INTERNATIONAL
 SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Date of mailing (day/month/year) 17/06/2008	
Applicant's or agent's file reference FN126-PCT	FOR FURTHER ACTION See paragraphs 1 and 4 below
International application No. PCT/IB2007/003985	International filing date (day/month/year) 02/08/2007
Applicant FOTONATION VISION LIMITED	

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

When? The time limit for filing such amendments is normally two months from the date of transmittal of the International Search Report.

Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes
 1211 Geneva 20, Switzerland, Facsimile No.: (41-22) 338.82.70

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.
3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:
- ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.
- ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. Reminders

Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. These comments would also be made available to the public but not before the expiration of 30 months from the priority date.

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until **30 months** from the priority date (in some Offices even later); otherwise, the applicant must, within **20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the *PCT Applicant's Guide*, Volume II, National Chapters and the WIPO Internet site.

Name and mailing address of the International Searching Authority



European Patent Office, P.B. 5818 Patentlaan 2
 NL-2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
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Authorized officer

Brigitte Chiarizia

NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the *PCT Applicant's Guide*, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions, respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report and the written opinion of the International Searching Authority, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only (see *PCT Applicant's Guide*, Volume I/A, Annexes B1 and B2).

The attention of the applicant is drawn to the fact that amendments to the claims under Article 19 are not allowed where the International Searching Authority has declared, under Article 17(2), that no international search report would be established (see *PCT Applicant's Guide*, Volume I/A, paragraph 296).

What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When?

Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How?

Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference FN126-PCT	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/IB2007/003985	International filing date (day/month/year) 02/08/2007	(Earliest) Priority Date (day/month/year) 02/08/2006
Applicant FOTONATION VISION LIMITED		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 8 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the language, the international search was carried out on the basis of:

- ☒ the international application in the language in which it was filed
☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)).

c. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see Box No. I.

2. ☒ **Certain claims were found unsearchable** (See Box No. II)

3. ☐ **Unity of invention is lacking** (see Box No III)

4. With regard to the title,

- ☒ the text is approved as submitted by the applicant
☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

- ☒ the text is approved as submitted by the applicant
☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority

6. With regard to the drawings,

- a. the figure of the drawings to be published with the abstract is Figure No. 2
☐ as suggested by the applicant
☐ as selected by this Authority, because the applicant failed to suggest a figure
☒ as selected by this Authority, because this figure better characterizes the invention
- b. ☐ none of the figures is to be published with the abstract

INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2007/003985

A. CLASSIFICATION OF SUBJECT MATTER

INV. G06K9/62 G06K9/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G06K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, COMPENDEX, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>HALL P ET AL: "Merging and Splitting Eigenspace Models"</p> <p>IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINEINTELLIGENCE, IEEE SERVICE CENTER, LOS ALAMITOS, CA, US,</p> <p>vol. 22, no. 9,</p> <p>1 September 2000 (2000-09-01), pages 1042-1049, XP008081056</p> <p>ISSN: 0162-8828</p> <p>cited in the application</p> <p>the whole document</p> <p>-----</p> <p>-/--</p>	11,28

☒ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

Date of the actual completion of the international search

6 June 2008

Date of mailing of the international search report

17/06/2008

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl.
 Fax: (+31-70) 340-3016

Authorized officer

Granger, Bruno

INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2007/003985

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	HALL P ET AL: "Adding and subtracting eigenspaces with eigenvalue decomposition and singular value decomposition" IMAGE AND VISION COMPUTING, GUILDFORD, GB, vol. 20, no. 13-14, 1 December 2002 (2002-12-01), pages 1009-1016, XP008089613 ISSN: 0262-8856 the whole document -----	11,28
X	HALL P ET AL: "Adding and subtracting eigenspaces" PROCEEDINGS OF THE BRITISH MACHINE VISION CONFERENCE, XX, XX, vol. 2, 16 September 1999 (1999-09-16). pages 453-462, XP008089611 cited in the application the whole document -----	11,28
X	B. KUSUMOPUTRO ET AL: "Development of 3D Face Databases by using Merging and Splitting Eigenspace Models" WSEAS TRANS. ON COMPUTERS, vol. 2, no. 1, 2003, pages 203-209, XP008091807 the whole document -----	11,28
X	LIU X ET AL: "Eigenspace updating for non-stationary process and its application to face recognition" PATTERN RECOGNITION, ELSEVIER, GB, vol. 36, no. 9, 1 September 2003 (2003-09-01), pages 1945-1959, XP004429544 ISSN: 0031-3203 the whole document -----	11-28
A	CORCORAN PETER ET AL: "Automated sorting of consumer image collections using face and peripheral region image classifiers" IEEE TRANSACTIONS ON CONSUMER ELECTRONICS, IEEE SERVICE CENTER, NEW YORK, NY, US, vol. 51, no. 3, 1 August 2005 (2005-08-01), pages 747-754, XP008089612 ISSN: 0098-3063 cited in the application the whole document ----- -/--	11,28

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2007/003985

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
T	<p>JAVIER MELENCHÓN ET AL: "Efficiently Downdating, Composing and Splitting Singular Value Decompositions Preserving the Mean Information" PATTERN RECOGNITION AND IMAGE ANALYSIS LECTURE NOTES IN COMPUTER SCIENCE;;LNCS, SPRINGER BERLIN HEIDELBERG, BE, vol. 4478, 1 January 1900 (1900-01-01), pages 436-443, XP019060614 ISBN: 978-3-540-72848-1 -----</p>	11,28

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 1-10,12-27,29-34

III

III.1 Equation (13) (p. 13) contains a fatal flaw (operations on incoherent entities such as subtracting a vector (mean) from a matrix, subline 2). As the final equation is not given and as the combination of PCA dataset does not belong to the common general knowledge of the skilled person, the skilled person cannot use his common knowledge to determine ovc (equation (13)) and therefore cannot determine $\bar{E}T$ which is required for equation (14). Hence the potential invention related to equations (13) and (14) and case (ii) (p. 7, l. 15-16; p. 10, l. 10-11; p. 13, l. 2) is not disclosed in a manner sufficiently clear and complete to be carried out by a person skilled in the art, Art. 5 PCT.

III.2 Claims 1-10, 12-27, 29-34 are so unclear and unsupported (Art. 6 PCT) that they cannot be meaningfully searched and examined, Art. 17(2)(a)(ii) and 34(4)(a)(ii) PCT.

III.3 Claim 1 cannot be understood, Art. 6 PCT. For example, as cases (i) and (ii) are exclusive (p. 7, l. 11-15; 10, l. 9-11):

- step (c) is about determining the modified representation using the original samples so that it cannot be interpreted as relating to case (i) (equation (12), see also p. 10, l. 18-19) and thus must be interpreted as relating to case (ii) of the desc., which itself is not disclosed in a clear and complete manner (see III.1 supra);
- on the other hand step (d) (combining without using original samples) contradicts equation (14) of the description, so that it cannot be interpreted as related to case (ii) (but instead to case (i)), in contradiction to step (c).

III.4 In addition, the following lacks of meaning (clarity) and support, Art 6 PCT, are noted about claims 2-9 depending on claim 1.

- In claim 2, the operation related to a "third collection" is not supported by the desc. (Art. 6 PCT) which describes only how to merge two collections.
- The subject-matter of claim 6 (combining training data) contradicts step (d) of claim 1 (combining without using the original samples).
- The subject-matter of claim 7 (not using original samples of the first collection) contradicts steps (a) and (c) of claim 1 (applying PCA on facial images).
- Claims 3, 4, 5, 8 and 9 depend on claim 1 which is not comprehensible.
- Claim 10 relates to a mathematical equation which has no meaning (operations on incoherent entities such as subtracting a vector (mean) from a matrix).

III.5 The same applies to claims 18-27 as they correspond to claims 1-10.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

III.6 Claims 12-17 and 29-34, depending on independent claims 11 and 28, are unclear and unsupported, Art. 6 PCT.

III.6.1 Claims 12 and 29 (updating based on "first" eigenvectors and original eigenvalues) contradict the description, where the updating is based instead on the modified eigenvectors and eigenvalues, see desc., p. 11, l. 12-15 or equation (12). This renders as well claims 13 and 30, which depend respectively on these claims 12 and 29, as well unclear and unsupported (it is noted that all these claims depend on claims 11 and 28 which relate to case (i)).

III.6.2 Claim 14 (resp. 31) contradicts step (a) of claim 11 (res. 28) on which it depends.

III.6.3 Claims 17 and 34 relate to a meaningless equation (see III.1 supra) (and this equation belongs to the part of the desc. related to case (ii), whereas claims 11 and 8 on which these dependent claims respectively depend, relate to case (i)).

III.6.4 Regarding claims 15, 16, 32 and 33, combining collections of samples having different dimensions implies that what is stored for the collections are the original samples instead of the principal components. Hence this contradicts the claims 11 and 18 on which these claims depend. In addition, the size of a vector is not a mathematical concept. Moreover, even if the "size" of the eigenvectors was to be interpreted:

I - as their norm, then since eigenvectors have a unitary norm, the expression "re-sizing the eigenvectors" would be meaningless;
 - as their dimension, then expanding their dimension to that of the sample image would be absurd as it would not lead to any dimensionality reduction.

Hence these claims cannot be understood, art. 6 PCT.

It is also remarked that corresponding passage in the desc. (p. 12, l. 6-11) is as obscure as the claims.

VIII The following features of claims 11 and 28 are not supported and therefore not searched and examined, Art. 17(2)(a)(ii) and 34(4)(a)(ii) PCT, although the other features of these claims are searched and examined.

VIII.1 How any of the methods dealt with in the application could relate to more than two collections (see first line of the independent claims) is not disclosed and therefore not supported, Art. 6 PCT.

VIII.2 Each independent claim covers in its fourth line "including at least principle component analysis (PCA) features", however the application does not disclose how to extend eigenspace merging to other features nor is this part of the common general knowledge according to the books mentioned supra, so that "at least" is not supported.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.2), should the problems which led to the Article 17(2)PCT declaration be overcome.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2007/003985

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☒ Claims Nos.: 1-10, 12-27, 29-34
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
see FURTHER INFORMATION sheet PCT/ISA/210

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/B2007/003985

International filing date (day/month/year)
02.08.2007

Priority date (day/month/year)
02.08.2006

International Patent Classification (IPC) or both national classification and IPC
INV. G06K9/62 G06K9/00

Applicant
FOTONATION VISION LIMITED

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



European Patent Office - P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk - Pays Bas
Tel. +31 70 340 - 2040 Tx: 31 651 epo nl
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Date of completion of
this opinion

see form
PCT/ISA/210

Authorized Officer

Granger, Bruno

Telephone No. +31 70 340-3824



**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/B2007/003985

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - ☒ the international application in the language in which it was filed
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ on paper
 - ☐ in electronic form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in electronic form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
4. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of

☐ the entire international application

☒ claims Nos. 1-10,12-27, 29-34

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international search (*specify*):

☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 1-10,12-27, 29-34 are so unclear that no meaningful opinion could be formed (*specify*):

see separate sheet

☒ the claims, or said claims Nos. 1-10,12-27, 29-34 are so inadequately supported by the description that no meaningful opinion could be formed (*specify*):

see separate sheet

☒ no international search report has been established for the whole application or for said claims Nos. 1-10,12-27, 29-34

☐ a meaningful opinion could not be formed without the sequence listing; the applicant did not, within the prescribed time limit:

☐ furnish a sequence listing on paper complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Searching Authority in a form and manner acceptable to it.

☐ furnish a sequence listing in electronic form complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Searching Authority in a form and manner acceptable to it.

☐ pay the required late furnishing fee for the furnishing of a sequence listing in response to an invitation under Rules 13*ter*.1(a) or (b).

☐ a meaningful opinion could not be formed without the tables related to the sequence listings; the applicant did not, within the prescribed time limit, furnish such tables in electronic form complying with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions, and such tables were not available to the International Searching Authority in a form and manner acceptable to it.

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in electronic form only, do not comply with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions.

☐ See Supplemental Box for further details

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/IB2007/003985

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability: citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	<u>11,28</u>
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>11,28</u>
Industrial applicability (IA)	Yes: Claims	<u>11,28</u>
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

VII

VII.1 The application contains obvious mistakes (R. 91.1 PCT):

- VII.1.1 p. 14, l. 19 should have fig. 5 instead of fig. 2;
- VII.1.2 p. 8, l. 2 should have $N < m$ as exemplar values of N are 140 or 240 (p. 14, l. 1.5) while exemplar values of m are 256 (p. 14, l. 9), 1028 (p. 7, l.4), 5096 (p. 16, 6); that N is quite less than m is also known from the common general knowledge of the skilled person in face recognition;
- VII.1.3 p. 10, l. 24 refers to "[5]" which is not listed anywhere (but seems to correspond to p. 6, l. 3-5, which contains mistaken page numbers);
- VII.1.4 the first two equations of p. 11, l. 1.1 (sublines 1.1-1.4) contain a fatal flaw (operations on incoherent entities such as subtracting a vector (mean) from a matrix); however since the final equation on sublines 1.5 and 1.6 is not wrong, no objection under Art. 5 PCT is raised.

VII.2 The scale of drawing on fig. 4 does not distinguish its essential details (the different curves), R. 11.13(c) PCT, although these details are required for proving that the theory (p. 6, l. 20) on which the potential invention relies has a real effect (p. 11, l. 9 - p. 12, l. 1; p. 14, l. 13-17).

III

III.1 Equation (13) (p. 13) contains a fatal flaw (operations on incoherent entities such as subtracting a vector (mean) from a matrix, subline 2). As the final equation is not given and as the combination of PCA dataset does not belong to the common general knowledge of the skilled person¹, the skilled person cannot use his common knowledge to determine \hat{Cov}_c (equation (13)) and therefore cannot determine \hat{E}^T which is required for equation (14). Hence the potential invention related to equations (13) and (14) and case (ii) (p. 7, l. 15-16; p. 10, l. 10-11; p. 13, l.2) is **not disclosed in a manner sufficiently clear and complete to be carried out by a person skilled in the art, Art. 5 PCT.**

¹ e.g. as determined by books such as I.T. Jolliffe's *Principal Component Analysis* (Springer, 2002) or E. Oja's *Subspace Methods for Pattern Recognition*. (Wiley, 1983)

III.2 Claims 1-10, 12-27, 29-34 are so unclear and unsupported (Art. 6 PCT) that they cannot be meaningfully searched and examined, Art. 17(2)(a)(ii) and 34(4)(a)(ii) PCT.

III.3 Claim 1 cannot be understood, Art. 6 PCT. For example, as cases (i) and (ii) are exclusive (p. 7, l. 11-15; 10, l. 9-11):

- step (c) is about determining the modified representation using the original samples so that it cannot be interpreted as relating to case (i) (equation (12), see also p. 10, l. 18-19) and thus **must be interpreted as relating to case (ii) of the desc., which itself is not disclosed in a clear and complete manner (see III.1 supra);**
- on the other hand step (d) (combining without using original samples) contradicts equation (14) of the description, so that **it cannot be interpreted as related to case (ii) (but instead to case (i)), in contradiction to step (c).**

III.4 In addition, the following lacks of meaning (clarity) and support, Art 6 PCT, are noted about claims 2-9 depending on claim 1.

- In claim 2, the operation related to a "third collection" is not supported by the desc. (Art. 6 PCT) which describes only how to merges two collections.
- The subject-matter of claim 6 (combining training data) contradicts step (d) of claim 1 (combining without using the original samples).
- The subject-matter of claim 7 (not using original samples of the first collection) contradicts steps (a) and (c) of claim 1 (applying PCA on facial images).
- Claims 3, 4, 5, 8 and 9 depend on claim 1 which is not comprehensible.
- Claim 10 relates to a mathematical equation which has no meaning (see the two equations mentioned in VII.1.4 supra).

III.5 The same applies to claims 18-27 as they correspond to claims 1-10.

III.6 Claims 12-17 and 29-34, depending on independent claims 11 and 28, are unclear and unsupported, Art. 6 PCT.

III.6.1 Claims 12 and 29 (updating based on "*first*" eigenvectors and original eigenvalues) contradict the description, where the updating is based instead on the *modified* eigenvectors and eigenvalues, see desc., p. 11, l. 12-15 or equation (12). This renders as well claims 13 and 30, which depend respectively on these claims 12 and 29, as well

unclear and unsupported (it is noted that all these claims depend on claims 11 and 28 which relate to case (i)).

III.6.2 Claim 14 (resp. 31) contradicts step (a) of claim 11 (res. 28) on which it depends.

III.6.3 Claims 17 and 34 relate to a meaningless equation (see III.1 supra) (and this equation belongs to the part of the desc. related to case (ii), whereas claims 11 and 8 on which these dependent claims respectively depend, relate to case (i)).

III.6.4 Regarding claims 15, 16, 32 and 33, combining collections of samples having different dimensions implies that what is stored for the collections are the original samples instead of the principal components. Hence this contradicts the claims 11 and 18 on which these claims depend. In addition, the size of a vector is not a mathematical concept. Moreover, even if the "size" of the eigenvectors was to be interpreted:

- as their norm, then since eigenvector have a unitary norm, the expression "re-sizing the eigenvectors" would be meaningless:

- as their dimension, then expanding their dimension to that of the sample image would be absurd as it would not lead to any dimensionality reduction.

Hence these claims cannot be understood, art. 6 PCT.

It is also remarked that corresponding passage in the desc. (p. 12, l. 6-11) is as obscure as the claims.

VIII The following features of claims 11 and 28 are not supported and therefore not searched and examined, Art. 17(2)(a)(ii) and 34(4)(a)(ii) PCT, although the other features of these claims are searched and examined.

VIII.1 How any of the methods dealt with in the application could relate to *more than two collections* (see first line of the independent claims) is not disclosed and therefore **not supported**, Art. 6 PCT.

VIII.2 Each independent claim covers in its fourth line "including *at least* principle component analysis (PCA) features". however the application does not disclose how to extend eigenspace merging to other features nor is this part of the common general knowledge according to the books mentioned supra, so that "at least" is **not supported**.

V

- V.1 The application relates to pattern recognition. The problem to be solved is that adding many images such as faces to a collection of faces represented by their principal components requires recomputing the PCA basis vectors and thus recomputing the basis vectors on the basis of all original facial images (p.1, l. 26 - p. 2, l. 17).
- V.2 The solution aimed at is the merging eigenspaces which was already invented and disclosed by **Hall, 2000**, as is admitted in the desc. p. 4, l. 3-7. The main idea of the application (p. 12, l. 13-24; claims **11, 28**) is how to recompute the principal components for each image in the new, merged eigenspace representation. As Hall states that facial images are stored using an eigenmodel (p. 1047, section 6.1 par 1) it follows that Hall computes and stores their principal components. As Hall also states that he merges such eigenspaces, it follows that he implicitly recomputes their principal components and does it again after the eigenspace fusion (p. 1047, section 6.1 par 2). Hence the invention according to **claims 11 and 28 cannot be considered novel**, art. 33(1) PCT.

(It is noted that even if Hall had not mentioned this information on p.1047, section 6.1, par 1 and 2, when carrying out Hall's teaching, the skilled person would inevitably arrive at a result falling within the terms of these claims, *PCT Guidelines*, 12.04, so that even so these claims would not be considered novel).

Possible steps after receipt of the international search report (ISR) and written opinion of the International Searching Authority (WO-ISA)

General information	For all international applications filed on or after 01/01/2004 the competent ISA will establish an ISR. It is accompanied by the WO-ISA. Unlike the former written opinion of the IPEA (Rule 66.2 PCT), the WO-ISA is not meant to be responded to, but to be taken into consideration for further procedural steps. This document explains about the possibilities.
Amending claims under Art. 19 PCT	Within 2 months after the date of mailing of the ISR and the WO-ISA the applicant may file amended claims under Art. 19 PCT directly with the International Bureau of WIPO. The PCT reform of 2004 did not change this procedure. For further information please see Rule 46 PCT as well as form PCT/ISA/220 and the corresponding Notes to form PCT/ISA/220.
Filing a demand for international preliminary examination	<p>In principle, the WO-ISA will be considered as the written opinion of the IPEA. This should, in many cases, make it unnecessary to file a demand for international preliminary examination. If the applicant nevertheless wishes to file a demand this must be done before expiry of 3 months after the date of mailing of the ISR/ WO-ISA or 22 months after priority date, whichever expires later (Rule 54bis PCT). Amendments under Art. 34 PCT can be filed with the IPEA as before, normally at the same time as filing the demand (Rule 66.1 (b) PCT).</p> <p>If a demand for international preliminary examination is filed and no comments/amendments have been received the WO-ISA will be transformed by the IPEA into an IPRP (International Preliminary Report on Patentability) which would merely reflect the content of the WO-ISA. The demand can still be withdrawn (Art. 37 PCT).</p>
Filing informal comments	After receipt of the ISR/WO-ISA the applicant may file informal comments on the WO-ISA directly with the International Bureau of WIPO. These will be communicated to the designated Offices together with the IPRP (International Preliminary Report on Patentability) at 30 months from the priority date. Please also refer to the next box.
End of the international phase	At the end of the international phase the International Bureau of WIPO will transform the WO-ISA or, if a demand was filed, the written opinion of the IPEA into the IPRP, which will then be transmitted together with possible informal comments to the designated Offices. The IPRP replaces the former IPER (international preliminary examination report).
Relevant PCT Rules and more information	Rule 43 PCT, Rule 43bis PCT, Rule 44 PCT, Rule 44bis PCT, PCT Newsletter 12/2003, OJ 11/2003, OJ 12/2003

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